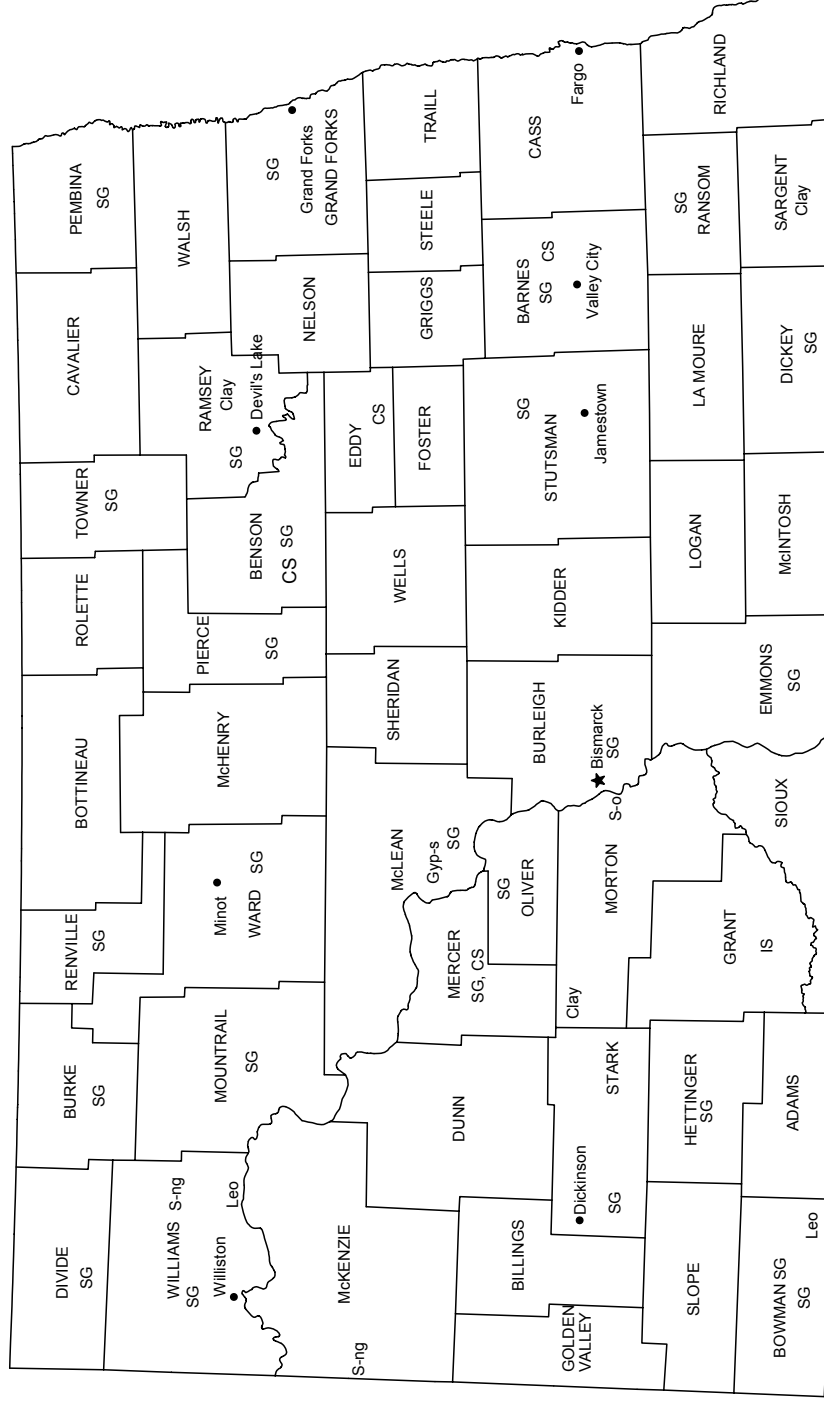


NORTH DAKOTA



LEGEND

County boundary

★ Capital

- City

MINERAL SYMBOLS

Clay Common clay

CS Crushed stone

Gyp-s Synthetic gypsum

IS Industrial sand

Leo Leonardite

S-ng Sulfur (natural gas)

S-0 Sulfur (oil)

SG Construction sand and gravel

0 50 Kilometers

THE MINERAL INDUSTRY OF NORTH DAKOTA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the North Dakota Geological Survey for collecting information on all nonfuel minerals.

In 2002, the estimated value¹ of nonfuel mineral production for North Dakota was \$38.7 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 16% increase from that of 2001² and followed a 5.4% decrease in 2001 from 2000.

North Dakota's leading nonfuel mineral by value in 2002 continued to be construction sand and gravel. This high-volume low-value commodity accounted for about three-fourths of the State's nonfuel mineral production value. Lime was second by value, and crushed stone was third. In 2002, lime led the State's increase in value. The State's drop in value in 2001 resulted from decreases in the values of construction sand and gravel and lime. Most other nonfuel mineral showed slight increases (table 1).

The following narrative information was provided by the North Dakota Geological Survey³ (NDGS).

Commodity Review

Industrial Minerals

During 2002, 15 surface mining operators in North Dakota reported information to the State Soil Conservation Committee (SSCC). (The SSCC collects production data by volume, unlike the USGS, which collects data by mass or metric tons produced.) Based on these reports, 82 hectares (ha) were affected. The quantity of minerals mined included 994,000 cubic meters (m³) of sand and gravel, 155,000 m³ of clay, 1,710 m³ of scoria, and 61,200 m³ of crushed stone, totaling 1.21 million m³ of mineral material. From 43 pits ranging in size from more than 0.1 ha to 14 ha, a total of about 177,000 m³ of overburden were disturbed.

Common Clays.—Well over one-half (67%) of the clay mined in North Dakota during this period, slightly more than 100,000 m³, was used to construct dikes and raise roads in the flooded area of Devils Lake. Water levels in this closed-basin lake have risen more than 8 meters since 1993 and caused more than \$300 million in damages to businesses, homes, and roads. The Hebron Brick Plant in Morton County continued to be the largest consumer of clay in North Dakota. In 2002, Hebron Brick Co. mined about 45,600 m³ of clay, at least one-half of which was kaolinite.

Leonardite.—Leonardite is an oxidized lignite. Georesources, Inc. of Williston and American Colloid Co. with mines in Scranton and Hayne and a processing plant in Gascoyne were the only leonardite mining operations in North Dakota. The two companies produced a combined total of nearly 46,000 metric tons (t) of leonardite in 2002, slightly less than the previous year's production. Leonardite is processed and used as a dispersant and for viscosity control in oil well drilling muds, as a stabilizer for ion-exchange resins in water treatment, and as a soil conditioner.

Other Industrial Minerals.—The coal gasification plant located near Beulah continued to operate an anhydrous ammonia plant. The anhydrous portion of the plant, in operation since spring 1997, has the capacity to produce 1,200 metric tons per day (t/d) of anhydrous ammonia. The plant averaged about 660 t/d during 2002. Total production of anhydrous ammonia in 2002 was slightly more than 240,000 t. In 2002, the gasification plant also produced more than 3.5 million liters (ML) of krypton and xenon; approximately 14.1 ML of phenol; 13.6 ML of cresylic acid; 8.9 ML of naptha; and about 198,000 liters of nitrogen. Additionally, ammonium sulfate production from the stack gas scrubber was slightly more than 88,000 t, and the plant shipped about 24,000 million standard cubic feet of carbon dioxide for use in enhanced oil field recovery.

Legislation and Government Programs

The SSCC, as designated by the State legislature, continued to administer the Surface Mining Report Law, which required any person conducting surface mining operations for minerals other than coal to comply with the reporting requirements of North Dakota Century Code chapter 38-16. Minerals included under the law remain cement rock, clay, gravel, limestone, manganese, molybdenum, peat, potash, pumicite, salt, sand, scoria, stone, sodium sulfate, zeolite, and other minerals except coal. The SSCC has the regulatory authority to administer the reporting requirement, while the actual regulatory authority for most of these mining activities rests with

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2002 USGS mineral production data published in this chapter are preliminary estimates as of July 2003 and are expected to change. Construction sand and gravel and crushed stone estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Values, percentage calculations, and rankings for 2001 may differ from the Minerals Yearbook, Area Reports: Domestic 2001, Volume II, owing to the revision of preliminary 2001 to final 2001 data. Data for 2002 are preliminary and are expected to change; related rankings may also change.

³Edward C. Murphy, Geologist, authored the text of State mineral industry information provided by the North Dakota Geological Survey.

the North Dakota Geological Survey. The law requires that any person or company that within 1 calendar year removes 7,650 m³ (10,000 cubic yards) or more of earthen materials or products (including overburden) affecting 0.2 ha (0.5 acre) or more in combined mining operations must report the particulars of its surface mining activities. Some operators of smaller operations cooperate by voluntarily submitting summary reports to the SSCC although not required to by law. Nevertheless, because not all operations report, the summary of surface mining statistics presented above is a conservative estimate of the amount of nonfuel minerals mined in North Dakota in 2002.

The NDGS continued the process of entering all geologic information from its subsurface mineral program into a computerized database. This information was used for a number of purposes, including redefining the State's lignite and uranium resources and generating source and other information on the State's nonfuel minerals (clay, leonardite, sand and gravel, and stone).

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NORTH DAKOTA^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2000		2001		2002 ^p	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	79	W	68	W	W	W
Gemstones	NA	3	NA	3	NA	4
Lime	176	7,000	184	6,360	179	11,500
Sand and gravel:						
Construction	10,600	27,800	10,300	26,300	10,300	26,700
Industrial	1	W	W	W	W	W
Combined values of stone [crushed limestone, volcanic cinder, and miscellaneous (2000-01) and crushed volcanic cinder (2002)] and values indicated by symbol W	XX	410	XX	623	XX	554
Total	XX	35,200	XX	33,300	XX	38,700

^pPreliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
NORTH DAKOTA: CRUSHED STONE SOLD OR USED, BY KIND

Kind	2000				2001			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	1	W	W	W	1	W	W	W
Volcanic cinder and scoria	2 ^r	W	W	W	2	W	W	W
Miscellaneous stone	3 ^r	W	W	W	3	W	W	W
Total or average	XX	W	W	W	XX	W	W	W

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

TABLE 3
NORTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate, graded:			
Bituminous aggregate (coarse)	W	W	\$4.08
Railroad ballast	W	W	8.24
Coarse and fine aggregates, graded road base or subbase	W	W	8.13
Other miscellaneous uses and specified uses not listed	W	W	4.68
Unspecified, reported ¹	W	W	3.68
Total or average	W	W	4.71

W Withheld to avoid disclosing company proprietary data.

¹Reported production without a breakdown by end use.

TABLE 4
NORTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates (including concrete sand)	185	\$1,060	\$5.74
Asphalt concrete aggregates and road base materials	2,870	6,530	2.28
Fill ²	179	225	1.26
Unspecified: ³			
Reported	82	261	3.18
Estimated	7,000	18,000	2.59
Total or average	10,300	26,300	2.54

¹Data are rounded to no more than three significant digit, except unit value; may not add to totals shown.

²Includes snow and ice control.

³Reported and estimated production without a breakdown by end use.